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An Operator's Perspective of RAAF
Command and Support Systems

J. Clothier and J. O'Neill

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# An Operator's Perspective of RAAF Command Support Systems

*J. Clothier & J. O'Neill*

**A Report from Task Air 93/025**
**"RAAF Command Support Working Group Study"**

DSTO-CR-0005

## ABSTRACT

DSTO investigated future Command Support System requirements for the RAAF as part of Task Air 93/025 RAAF Command Support Working Group Study. This document demonstrates how a Command Support System can be used to support Air Command personnel performing their work. A Future Day in the Life of Air Command using these Command Support Systems is described. For each key event, an example is drawn from the prototypes to demonstrate how the event was implemented, and the event is then linked back to the Organisational Analysis.

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# An Operator's Perspective of RAAF Command Support Systems

## EXECUTIVE SUMMARY

DSTO investigated future Command Support System requirements for the RAAF as part of Task Air 93/025 RAAF Command Support Working Group Study. This document demonstrates how a Command Support System can be used to support Air Command personnel performing their work. A Future Day in the Life of Air Command using these Command Support Systems is described. For each key event, an example is drawn from the prototypes to demonstrate how the event was implemented, the underlying concepts, and the event is then linked back to the Organisational Analysis.

A summary of the concepts that need to be explicitly represented and supported in Command Support Systems includes:

- Individuals perform Roles
- Individuals work at Desktops
- Individuals perform roles as members of Functional Cells
- Individuals perform roles in Organisational Units
- Views of Information
- Share information across the Organisation
- Communication between Individuals
- Informal Tasks
- Find Information
- Create and Visualise Plans
- Performing a Formal Task
- Linking Different Types of Information from Different Sources
- Changing Organisational Requirements
- Re-allocating Assets and Information Dynamically
- Dynamically Link New Information to Tools
- Different Views of Information for Different Tasks
- Distributed Decision-Making

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# List of Abbreviations

ACAUST      Air Commander Australia
ACSS        Air Command Support System
ADF         Australian Defence Force
AHQ         Air Headquarters
AME         Alternate Mission Equipment
ATO         Air Tasking Order
BSXO        Battle Staff Executive Officer
CDRTFG      Commander Tactical Fighter Group
CSS         Command Support System
EW          Electronics Warfare
EWO         Electronics Warfare Officer
GIS         Geographic Information System
HQ81Wing    Headquarters 81 Wing
HQ82Wing    Headquarters 82 Wing
INTSUM      Intelligence Summary
LOGENG      Logistics and Engineering Officer
OC81Wing    Officer Commanding 81 Wing
OPINST      Operations Instruction
OPORD       Operations Order
OPSO        Operations Officer
PlansTF     Plans Tactical Fighter
RAAF        Royal Australian Air Force
RAP         Recognised Air Picture
SADC        Sector Air Defence Commander
SADOC       Sector Air Defence Operations Centre
SOP         Standard Operating Procedures
WEAPO       Weapons Officer

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# A Future Day in the Life of Air Command

The following account is of a future day in the life of Air Command during a crisis situation. It illustrates the flow of information within AHQ, through to Wings, Squadrons, and SADOCs. It also shows how command support systems benefit staff throughout the organisation.

*0700—CDRTFG Arrives at AHQ*

The Commander of the Task Force Group (CDRTFG) logs on to the new Air Command Support System (ACSS) and checks the current situation. The situation awareness display shows the current deployment and status of all forces. It can also be reversed so that incidents that occurred overnight can be replayed. CDRTFG can view 81 Wing's Tasking Board electronically to determine the current status of all aircraft. CDRTFG prepares for a Battle Staff meeting, copies the disposition and location of 81 Wing's assets, and, with the Briefing Tool, creates a brief.

*0715—OPSO at HQ81 Wing Schedules a Maritime Strike ATO Request*

Meanwhile the next shift has started work at 81Wing Headquarters, and the new OPSO catches up on all the changes to the tasking boards since his previous shift. He does this by scrolling through the automated change log, which records the changes to the tasking board, and he links any developments to the related flight folders, OPORDs, ATO requests and ATOs.

A new ATO request has arrived, as shown by the alert on the OPSO's screen. A display of new ATO requests shows all the unscheduled requests. The OPSO selects an ATO request and displays the details—the mission in this case is a maritime strike using F111s from 82 Wing. The OPSO checks the electronic tasking board to determine if sufficient aircraft are available to perform the mission. The OPSO uses the *Mission Planning Tool* to determine the flying requirements for the mission. Weapon assignments are also planned for each aircraft. The OPSO and WEAPO hold a desktop conference—involving voice, video and the exchange of documents—to determine the optimum method for taking out the target with the weapons available. The OPSO conducts a desktop conference with the EWO to determine the electronic warfare requirements. The weapon requirements determine the Alternate Mission Equipment (AME) fitted to the F111s. The OPSO holds a further desktop conference with the LOGENG to determine whether sufficient AME is available, and which aircraft are fitted with the AME.

The OPSO, having determined 81 Wing's requirements for the mission, collaborates with the OPSO 82 Wing to deconflict the route and EW requirements. Using the Navigation Tool, he locates the OPSO at 82 Wing, and uses the e-mail component of the communications tool to send the route and EW requirements to the OPSO at 82 Wing. The OPSOs conduct a desktop conference to discuss the mission requirements and to resolve any problems.

*0735—OPSO at HQ82 Wing Schedules the Same Maritime Strike ATO Request*

At 82 Wing the OPSO has followed similar procedures to those followed by the OPSO 81 Wing to determine the requirements for the F111s. On receiving the route and EW requirements from the OPSO at 81 Wing, he initiates a desktop conference with the EWO to deconflict the electronic warfare requirements. He uses the Geographic Information System (GIS) to model the terrain, and determines tactics as the route requirements are deconflicted. The OPSO, having modified the route and EW requirements, uses the Navigation and Communications Tools to send the modified requirements back to the OPSO at 81 Wing as an e-mail document. Finally, he details the ATO request on the tasking board. The ATO is generated automatically and sent to 1 Squadron.

*0750—OPSO at HQ81 Wing Completes the Scheduling of the Maritime Strike ATO Request*

At HQ81Wing the OPSO, having received the modified route and EW requirements, and having assessed their validity, details the ATO request on to the tasking board. The ATO is generated automatically and sent to 77 Squadron.

*0800—AHQ Holds Battle Staff Meeting*

Back at AHQ, meanwhile, all group commanders and section heads have assessed the situation and, using the Briefing Tool, have prepared briefs which outline the actions and plans of their forces. The intelligence brief reveals that two Kamarian aircraft which intercepted a Qantas Jumbo jet were identified as having originated from a Kamarian aircraft carrier which was detected to the north-west of Darwin.

The incident is replayed on the Situation Awareness Display, and ACAUST plans its response to the Kamarian threat, while the display also presents the estimated position of the carrier 24 hours in the future, while friendly forces are displayed in terms of their bases and resources available in the area. ACAUST decides to establish a sector, centred on Darwin, which is drawn on the Situation Awareness Display using inbuilt drawing tools. The ACAUST holds further discussions and decides that the Sector needs military reinforcements. On the basis of the CDRTFG's brief, he re-deploys 8 F18s to Darwin, supported by 2 B707s. The 8 F18s are to form a detachment, while the B707s are assigned operational control to OC81Wing—the resources are re-allocated graphically on the Situation Awareness Display, while the BSXO summarises the plan and the Battle Staff members agree to its implementation. CDRTFG is assigned responsibility for producing the directive and OPINST. To facilitate the production of these documents, the Situation Awareness Display along with generating the planning information, also takes a *snapshot* of the situation for later evaluation.

*0845—PlansTF in the Plans Functional Cell at AHQ—Producing an OPINST*

CDRTFG now delegates responsibility for producing the OPINST to PlansTF. Assembling the OPINST is a relatively straight-forward task using a template for OPINSTs which has been loaded into the Word Processing Tool. PlansTF displays the information available from the Intelligence functional cell and accesses the latest INTSUM. This provides the Situation section for his OPINST. The snapshot generated at the Battle Staff meeting provides the basis for describing the Mission section.

# 1. Introduction

Recent strategic documents have highlighted the increasing importance of Command, Control and Communications. In 1993, the Strategic Review document listed Command, Control and Communications as a Support Role. In 1994, the Defence White Paper listed Command, Control and Communications as a Key Role. Effective Command, Control and Communications enables increased leverage of the ADF's limited resources.

Future Command Support System (CSS) requirements for the Royal Australian Air Force (RAAF) are being investigated. The first phase of this project called for the DSTO Command Support Systems Group to scope the size of the study. The results of the initial study were presented in a set of the following documents:

- *Final Report of Task Air 93/025 RAAF Command Support Working Group Study* addresses the broad capabilities required of RAAF Command Support Systems. This document includes a context-analysis of RAAF Command Support Systems in relation to RAAF information systems and other ADF Command Support Systems.

- *RAAF Command and Control: An Organisational Analysis Perspective* identifies the decisions made and the key decision-makers at a representative set of RAAF Command Centres. The information required to support these decisions is also documented.

- *Prototype User Interfaces for Future RAAF Command Support Systems* documents the Prototype developed, and proposes a preliminary specification of user requirements for RAAF Command Support Systems.

- *Prototype Technical Documentation* provides the technical documentation for the Prototype developed.

- *An Operator's Perspective of RAAF Command Support Systems* demonstrates how a RAAF Command Support System can support RAAF personnel, the types of tasks performed by RAAF personnel, and linked these tasks to the *RAAF Command and Control: An Organisational Analysis Perspective* and the *Prototype User Interfaces for Future RAAF Command Support Systems* documents.

## 1.1. Purpose

The purpose of the Operator Perspective document is to demonstrate how a CSS can be used to support Air Command personnel performing their work. This document describes different ways Air Command personnel may be supported, and provides detailed examples. These examples are linked to the Prototype to show the types of support that could be provided. They are also linked to the detailed analysis developed by DSTO to identify the types of information that may be required, and the relationships between this information.

## 1.2. Intended Audience

The primary audience for this document are future users of a RAAF CSS. The document aims to provide them with a knowledge and understanding not only of their own roles and tasks, but also how the RAAF CSS supports them in performing those tasks.

This document, which presents the user requirements for a RAAF CSS, is intended for information systems specialists, policy and standards personnel, and future tenderers.

## 1.3. Using this Document

This document is broadly organised around key events taken from *A Future Day in the Life of Air Command*. For each event:

- A detailed explanation of an event is provided

- An underlying concept is identified and explained

- An example is drawn from the Prototype and reveals how the event was implemented

- An event is linked to an analysis which shows users how to navigate through the analysis

# 2. Description of Events

## 2.1. CDRTFG Logs on to the New Air Command Support System

The event *CDRTFG logs on to the new Air Command Support System* introduces four concepts. First, individuals perform roles. Second, individuals operate computer screens at desktops. Third, individuals perform roles in functional cells. Fourth, individuals perform roles in functional cells within organisation units.

### 2.1.1. Individuals Perform Roles

*RAAF Example*

An Air Commodore fills the position CDRTFG and performs the role of Group Commander at Air Headquarters. At the Battle Staff meeting, CDRTFG has the authority and responsibility for presenting the perspectives of Tactical Fighter Groups.

*Concept*

People who work in organisations perform one or more roles, for example, Air Commodore Dave Bowden currently performs the role CDRTFG. Associated with these roles are authorities and responsibilities for performing sets of tasks.

*Link to Prototype*

This concept allows users to select their roles in the organisational units in which they are working, and is implemented in the Prototype, as shown in Figure 1.
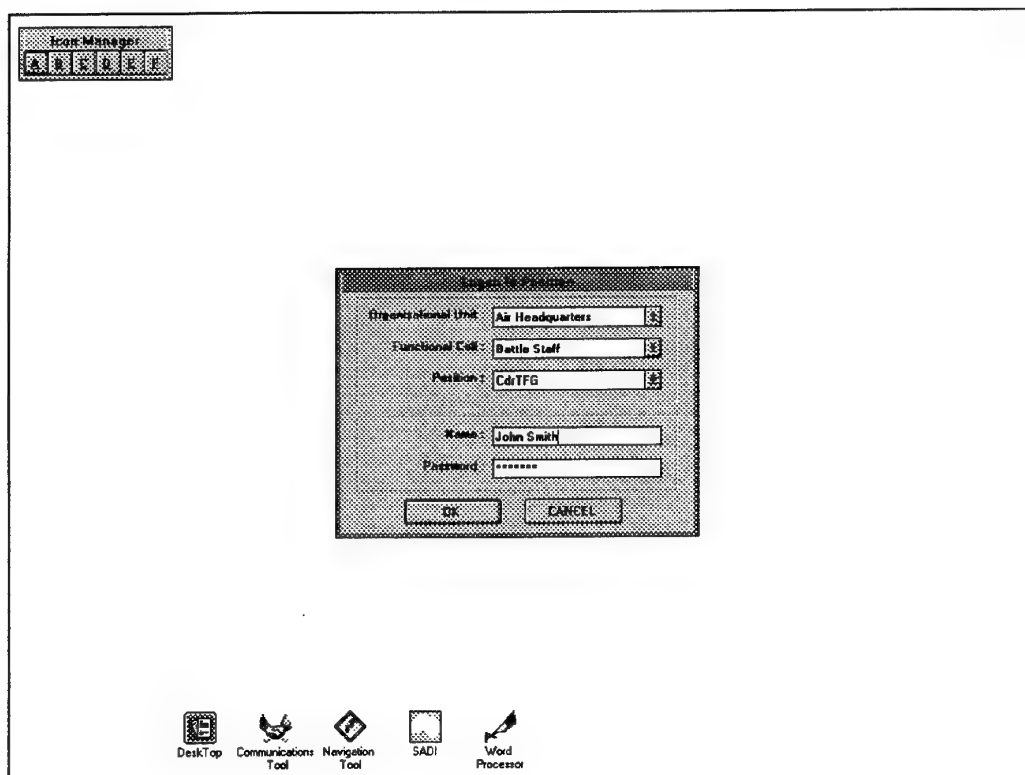
*Figure 1. Log-on screen for CDRTFG.*

## Link to Analysis

Intelligent Agents represent individuals in organisations. For example, the Intelligent Agent representing CDRTFG at Air Headquarters is known as *Intelligent Agent CDRTFG at Air Headquarters*—whose role is to document the roles performed by CDRTFG and their associated responsibilities. The Intelligent Agent also documents CDRTFG's requirements for information and tools associated with the role *Group Commander at Air Headquarters*.

Role Agents represent the roles performed by individuals in organisations. To represent the role of Group Commander at Air Headquarters there is a Role Agent Group Commander at Air Headquarters, who documents the role's responsibilities, and the associated information and tools necessary to perform the tasks associated with that role.

## 2.1.2. Individuals Work at Desktops

### RAAF Example

CDRTFG, having logged on, is presented with a screen displaying a desktop that contains all the tools and information required to perform the tasks associated with the role of Group Commander at Air Headquarters. CDRTFG views the current tasking of 81 Wing's aircraft, and uses the Briefing Tool to prepare a brief for the Battle Staff meeting based on said information.

*Concept*

Desktops are work areas for individuals who use tools to create and manipulate information for specified purposes.

*Link to Prototype*

The Prototype, which implements this concept, provides users with desktop environments which incorporate tools and information as shown in Figure 2.
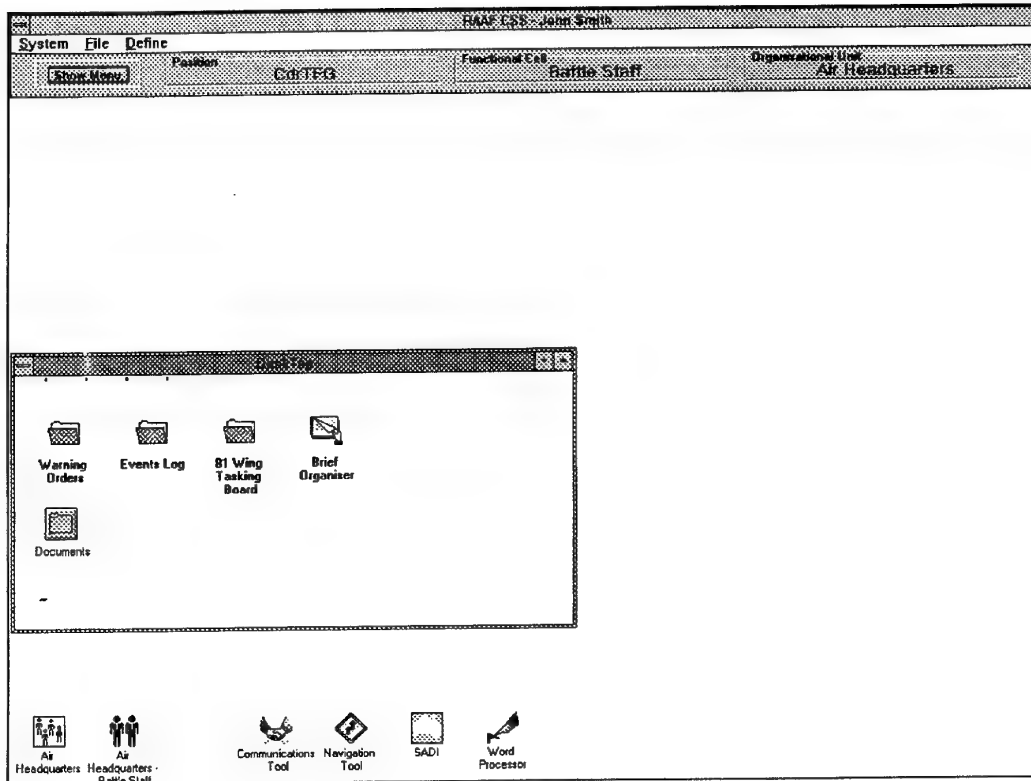


*Figure 2.    Desktop support for CDRTFG at Air Headquarters.*

*Link to Analysis*

Intelligent Agents represent the people in organisations. To represent CDRTFG at Air Headquarters, there is an Intelligent Agent CDRTFG at Air Headquarters, whose tools and information on their desktop are documented as part of the tool and information requirements for the Intelligent Agent CDRTFG at Air Headquarters.

## 2.1.3.    Individuals Perform Roles as Members of Functional Cells

*RAAF Example*

CDRTFG at Air Headquarters is a member of the functional cell *Battle Staff*. Other roles within the functional cell called *Operations* include ACAUST and BSXO. The functional cell can be used to share information and communicate with other roles to determine

how tasks are performed and problems are resolved. For example, CDRTFG views the briefs for the next Battle Staff meeting.

*Concept*

The roles performed by individuals are part of a branch of specialisations—for example, the role CDRTFG is part of the branch operations, and the role LOGENG is part of the branch logistics. The tasks associated with roles, and the information and tools necessary to complete them, will vary according to which roles are associated with which organisation units. For example, CDRTFG at Air Headquarters performs a different set of tasks to those performed by CDRTFG at Tactical Fighter Group—their information requirements are also different.

The tasks associated with roles, therefore, are both branch and organisation unit dependent, and to distinguish between the two, the concept of the functional cell was created, primarily as a relationship between the branch level and organisation level, and with which are associated all the roles required of the branch as an organisational unit.

A workspace is defined as an area where members of a functional cell share their tasks, information and tools.

*Link to Prototype*

This concept is implemented throughout the Prototype which provides users with workspace support, as shown in Figure 3. Within the workspace, users can access tools, information, and the roles within functional cells.
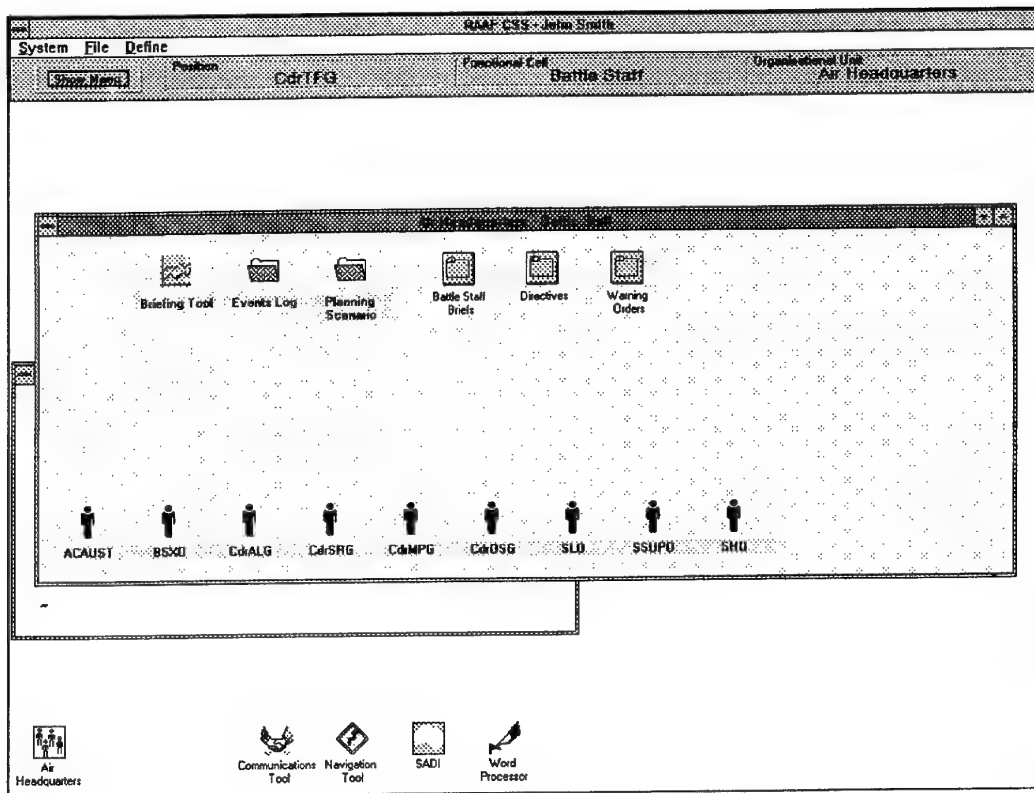
*Figure 3.    Workspace support for CDRTFG in functional cell Battle Staff.*

## Link to Analysis

Branch Agents represent the specialisations within organisations—for example, Branch Agent—Operations. They document the different roles within Branches, and for each role, describe the associated tasks. Branch Agents also document all the information and tool requirements for roles within Branches.

Functional Cell agents represent the specialisations within organisational units—for example, Functional Cell agent Battle Staff at Air Headquarters. They document the different roles within functional cells, and described the tasks associated with each role. Functional Cell Agents also document all the information and tool requirements for roles within functional cells.

## 2.1.4.    Individuals Perform Roles in Organisational Units

## RAAF Example

An example of an organisation unit is Air Headquarters—which, in turn, has different roles such as ACAUST, BSXO and OPSO. These provide the specialist knowledge required for Air Headquarters to conduct operational planning. The roles are organised into functional cells reflecting their specialisations, e.g. the Battle Staff functional cell contains the roles ACAUST, BSXO and CDRTFG.

## Concept

Associated with organisation units are all the roles and specialisations whose cumulative knowledge is required to perform particular types of work and tasks. Each role contributes different perspectives and specialist knowledge to the evaluation and resolution of problems. Organisation units provide mechanisms for performing routine tasks, along with a knowledge base of skills and expertise which can be applied to more dynamic tasks.

A workspace is an area where members of organisational units share tasks, information and tools.

## Link to Prototype

The Prototype, which implements this concept, provides users with workspace support, as shown in Figure 4. Within their workspaces, users can access the tools, information, and roles within their organisational units.
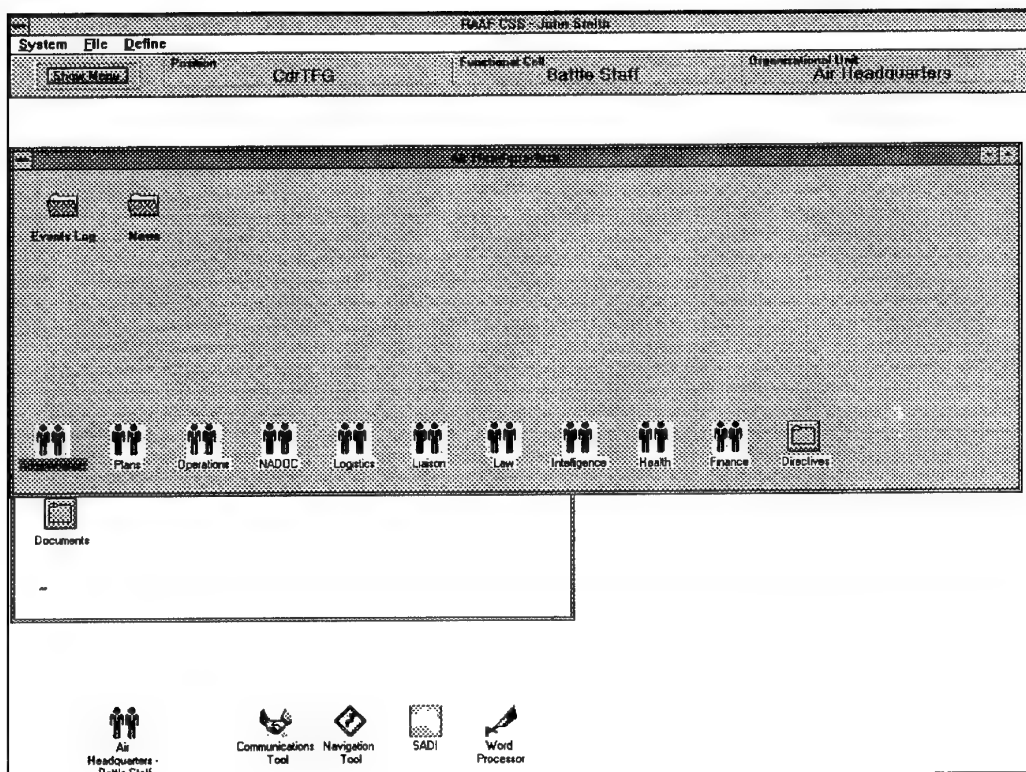


*Figure 4.    Workspace support for CDRTFG in organisation unit Air Headquarters.*

## Link to Analysis

Organisation unit agents represent organisation units—for example, Air Headquarters is represented by an organisation unit agent. The Functional Cell agents, Role agents, and Intelligent agents have been grouped according to their organisational units.

## 2.2. The Situation Awareness Display Shows the Current Situation of All Forces

The event *The situation awareness display shows the current situation of all forces* introduces various views of information.

### 2.2.1. Views of Information

*RAAF Example*

CDRTFG can use the Situation Awareness Display to view the current situation, and past events, and can customise the displays to show key pieces of information as identified from their perspective. For example, CDRTFG can choose to display all track information, all enemy and friendly air bases, all shipping in the region, while choosing to ignore the current location of, say, army units. For each key piece of information, CDRTFG can display associated information—for example, CDRTFG can select a particular air base and display associated information such as the number of aircraft stationed there.

*Concept*

The Situation Awareness Display provides views of the situation information, and can be customised to meet individual users' needs.

*Link to Prototype*

This concept is implemented in the Prototype which provides users with selective views of information along with the ability to display additional information. Figure 5 shows the Situation Awareness Display customised for CDRTFG—in this case, CDRTFG is displaying additional information for Tindal air base.
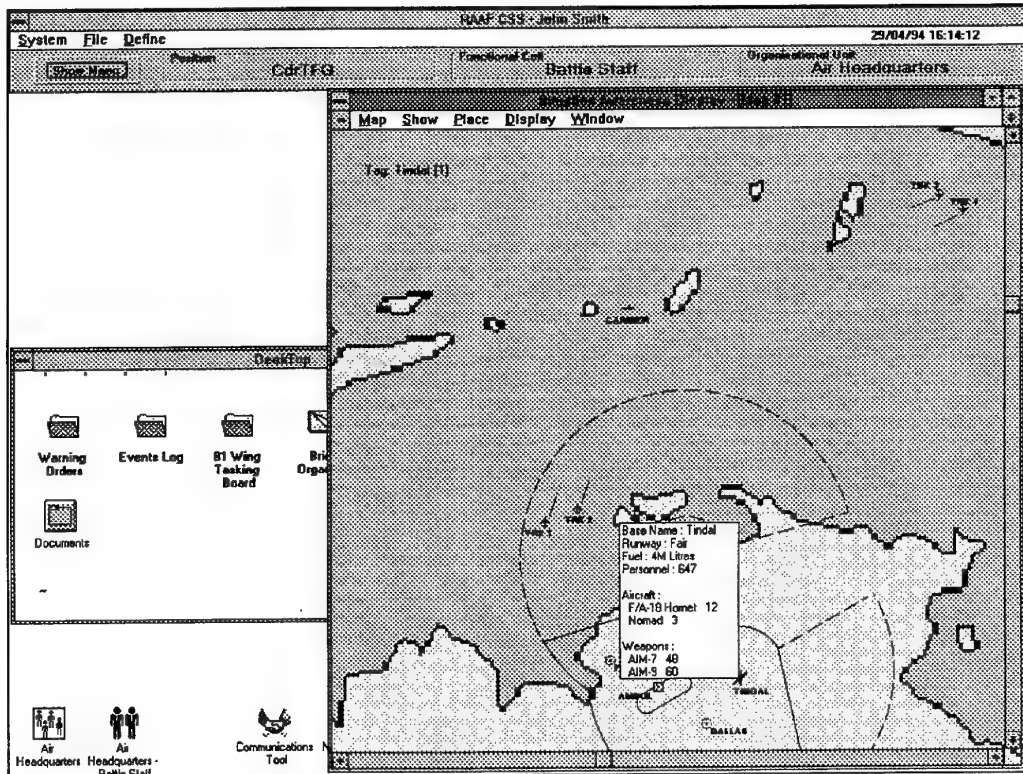
*Figure 5.    Views of information for CDRTFG at Air Headquarters.*

*Link to Analysis*

Intelligent Agents represent the people in organisations—for example, representing CDRTFG at Air Headquarters is Intelligent Agent CDRTFG at Air Headquarters. Information on desktops is also documented as part of the information requirements for the Intelligent Agent CDRTFG at Air Headquarters.

## 2.3.    CDRTFG can View 81 Wing's Tasking Board Electronically to Determine the Current Status of Their Aircraft

The event *CDRTFG can electronically view 81 Wing's Tasking Board to determine the current status of their aircraft* introduces the concept of information shared across the organisation.

### 2.3.1    Share Information across the Organisation

*RAAF Example*

When missions are scheduled, 81 Wing—who are responsible for monitoring and scheduling missions for their aircraft—communicate information to the operational squadron concerned to perform the mission. For Battle Staff to plan missions, however, they need to know the current tasking obligations of the aircraft involved as well—such tasking information, used for different types of planning, is the same at all

levels, for squadrons, wings, and Battle Staff. 81 Wing alone, however, can change the information. Others can only view the information and suggest changes.

*Concept*

Information is shared across organisations, as often the same information is required at multiple levels to facilitate different types of planning.

*Link to Prototype*

The Prototype, which implements the concept, provides CDRTFG with a view of 81 Wing's tasking board, as shown in Figure 6.
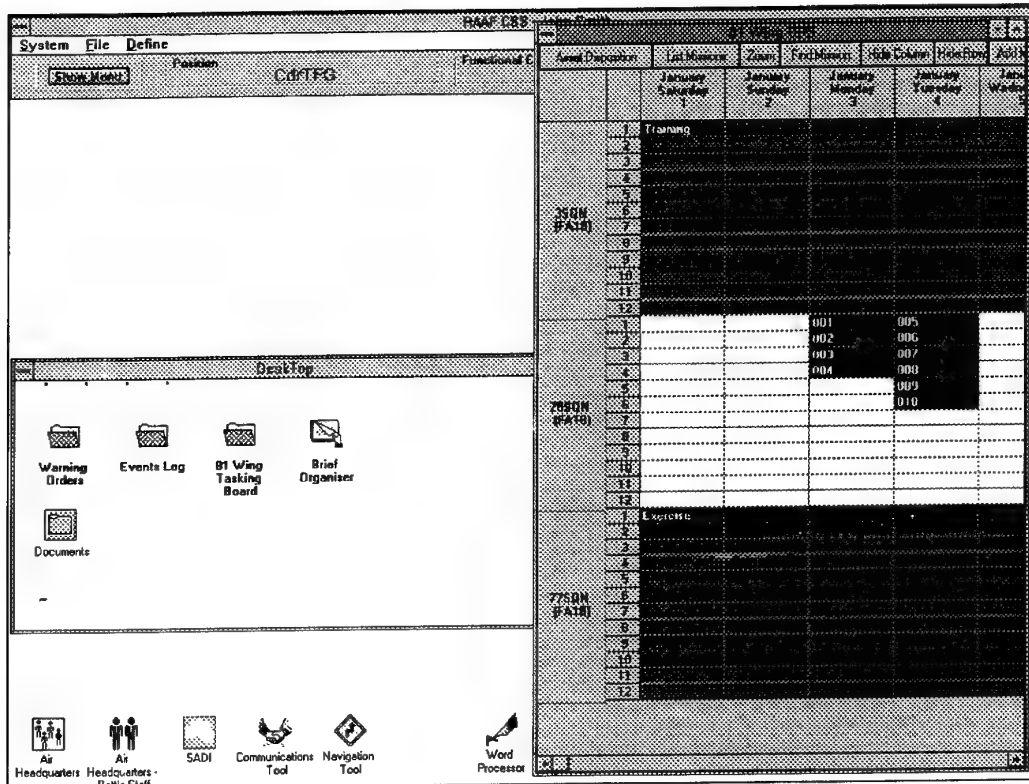


*Figure 6.    CDRTFG's view of 81 Wing's tasking board.*

*Link to Analysis*

Organisation unit agents represent organisation units—for example Headquarters 81 Wing is represented by an organisation unit agent. Organisation unit agents document the roles, tools, information and tasks required by individuals within their parts of the organisation structure.

Organisation agents represent the organisation structure—for example, 81 Wing is represented by an organisation agent. They document the roles, tools, information and tasks required by individuals within their various parts of the organisation structure.

## 2.4. The OPSO and WEAPO Hold a Desktop Conference

The event *The OPSO and WEAPO hold a desktop conference (involving Voice, Video and the Exchange of Documents)* introduces two concepts. The first is the ability to communicate between individuals. The second is the ability to support informal tasks.

### 2.4.1. Communication Between Individuals

*RAAF Example*

At Headquarters 81 Wing, the OPSO and WEAPO communicate to solve a mission scheduling problem. The WEAPO can identify the weapon requirements for taking out a target, and hence can calculate the number of aircraft required. The OPSO identifies the number of aircraft actually available and estimates the route planning requirements. By negotiating such details for taking out the target, the OPSO and WEAPO can perform the mission as efficiently and effectively as possible, while retaining sufficient aircraft and resources in reserve for performing other missions.

*Concept*

Different individuals in organisations perform different roles. Each role has its specialised functions and required knowledge. Communications between individuals performing different roles, and pooling of their knowledge, enables efficient problem-solving.

*Link to Prototype*

The Prototype, which implements this concept, provides a communication tool which enables different forms of communication, as shown in Figure 7.
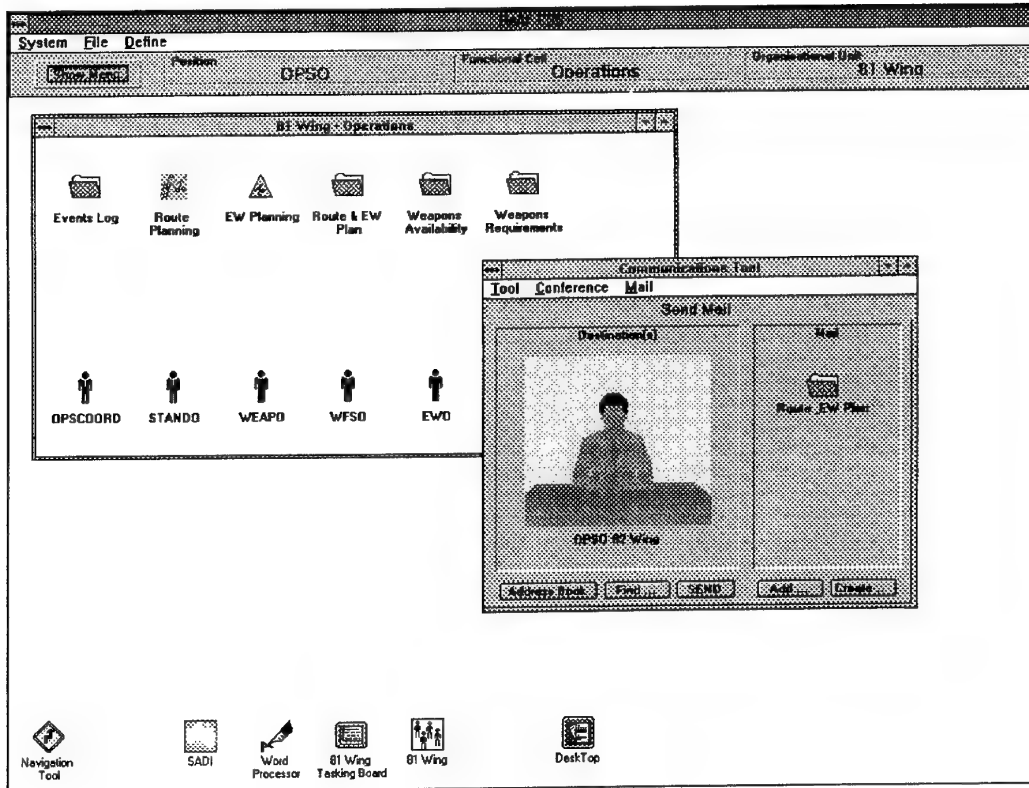
*Figure 7. Support for communications between individuals.*

## Link to Analysis

Intelligent Agents represent people in organisations—for example, representing OPSO at Headquarters 81 Wing is an Intelligent Agent OPSO at Headquarters 81 Wing. The information on desktops is documented as part of the information requirements for the Intelligent Agent OPSO at Headquarters 81 Wing.

## 2.4.2.  Informal Tasks

### RAAF Example

Most of the work tasks which individuals perform are routine formal ones. Some work, however, cannot be predicted, such as the planning and performance of UN peace-keeping operations. Existing organisation unit structures contain the cumulative knowledge for planning and performance of missions—for example, Air Lift Group has the expertise required to determine how air transport is used to support the peace-keeping troops in Somalia.

### Concept

Informal tasks are those performed by individuals to maximise the efficiency and effectiveness of other individual and group tasks. Informal tasks, which are additional to formal tasks and SOPs, often establish informal information flows which can occur both vertically and horizontally throughout an organisation. Informal information flows comprise discussions and sharing of information and documents.

*Link to Prototype*

The Prototype, which implements this concept, provides tools, information and access to other roles, as shown in Figure 8.
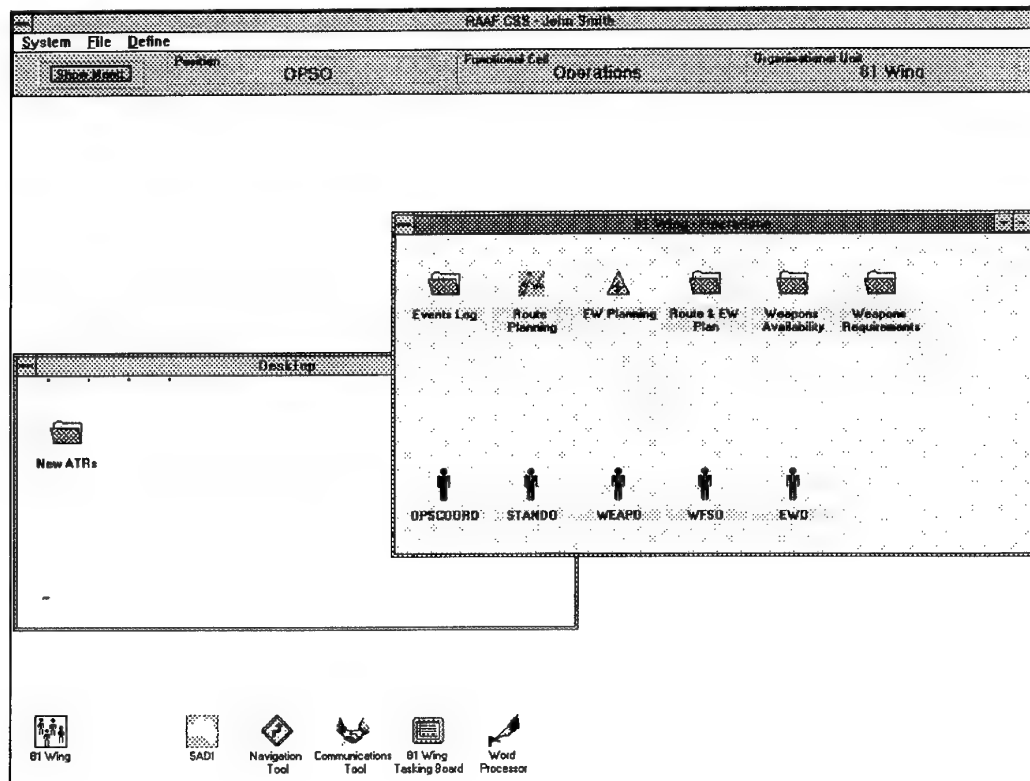


*Figure 8.    Support for informal tasks*

*Link to Analysis*

Intelligent Agents represent people in organisations—for example, representing OPSO at Headquarters 81 Wing is an Intelligent Agent OPSO at Headquarters 81 Wing. The information, tools and tasks on desktops are documented as part of the information requirements for the Intelligent Agent OPSO at Headquarters 81 Wing.

## 2.5.    Uses the Navigation Tool to Locate the OPSO

The event *Uses the navigation tool to locate the OPSO* introduces the concept of finding information.

### 2.5.1    Find Information

*RAAF Example*

A dynamic organisation, the RAAF is structured to adapt to meet the needs of situations—people move between positions, new resources are obtained, and existing resources are upgraded. In such an environment the task of finding the necessary and

most current information can be a challenging one. The Navigation Tool facilitates finding information as it adopts multiple perspectives: organisation structures, roles, individuals, resources, tools, information and tasks.

*Concept*

Individuals require different types of information to solve different problems. As new problems may require novel information, however, individuals need to identify and find their way through different types of information such as that concerning other people, resources, organisation structures, roles and associated tasks—and they may require different views of such information.

*Link to Prototype*

The Prototype, which implements this concept, provides a Navigation Tool which enables users to find the information they require, as shown in Figure 9.
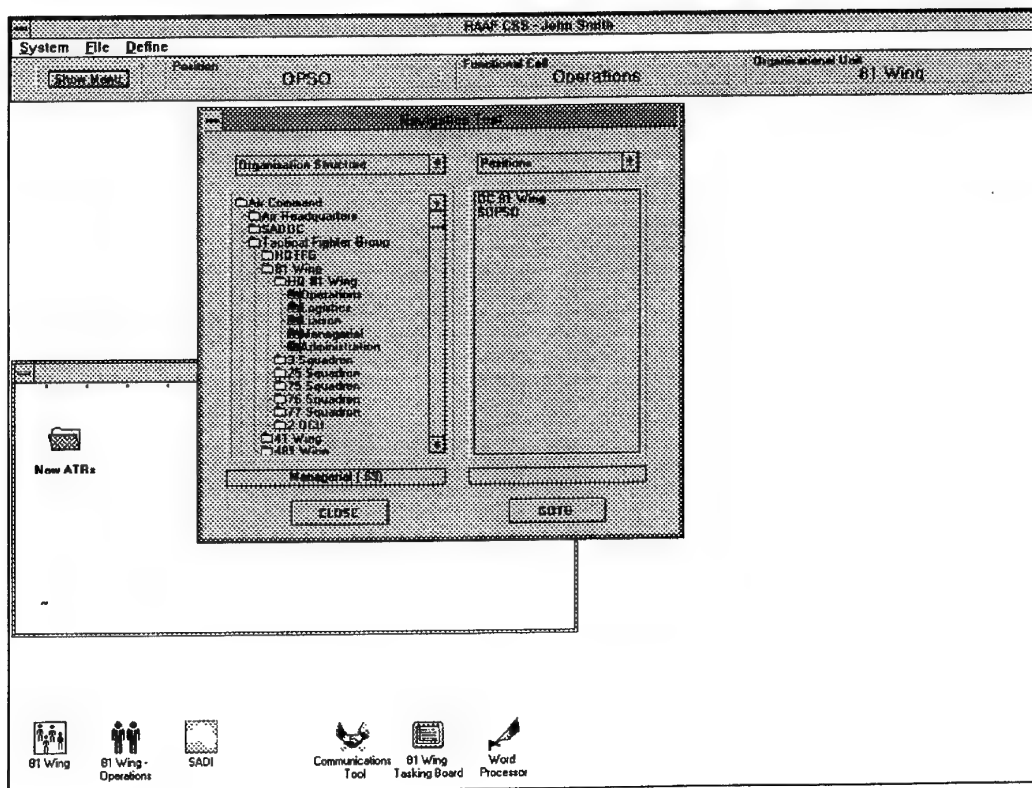


*Figure 9.    Support for finding information.*

*Link to Analysis*

Organisation Agents represent the organisation structure. They represent all the roles, tools, information and tasks required by individuals within their parts of the organisation structure—for example, 81 Wing is represented by an Organisation Agent. As well, Air Command is represented by an Organisation Agent who includes all the information about 81 Wing, plus other wings, groups, bases and Air Headquarters within Air Command.

Resource Agents represent the resources in the organisation structure. An example of a Resource Agent is the F18.

## 2.6. The Situation Awareness Display Projects the Estimated Position of Assets into the Future

The event *The situation awareness display projects the estimated position of the aircraft carrier 24 hours into the future. Friendly forces are displayed. The sector is drawn. 8 F18s are deployed to Darwin, supported by two B707s* introduces the concepts of creating and visualising plans.

### 2.6.1. Create and Visualise Plans

*RAAF Example*

The Battle Staff at Air Headquarters is responsible for strategic planning. Battle Staff members start the planning process by evaluating what has occurred, and what current situation is presented—from the perspectives of the Group Commanders and Section Heads. Intelligence functional cells predict enemy intentions and possible courses of action. Battle Staff, given this information, can then plan their responses to threat situations, and initiate offensive actions.

*Concept*

The ability to visualise plans assists the creation, evaluation and documentation of plans.

*Link to Prototype*

The Prototype, which implements this concept, provides a Mapping Tool which enables users to display current situations, to project said situations into the future, and re-allocate their forces graphically, as shown in Figure 10.
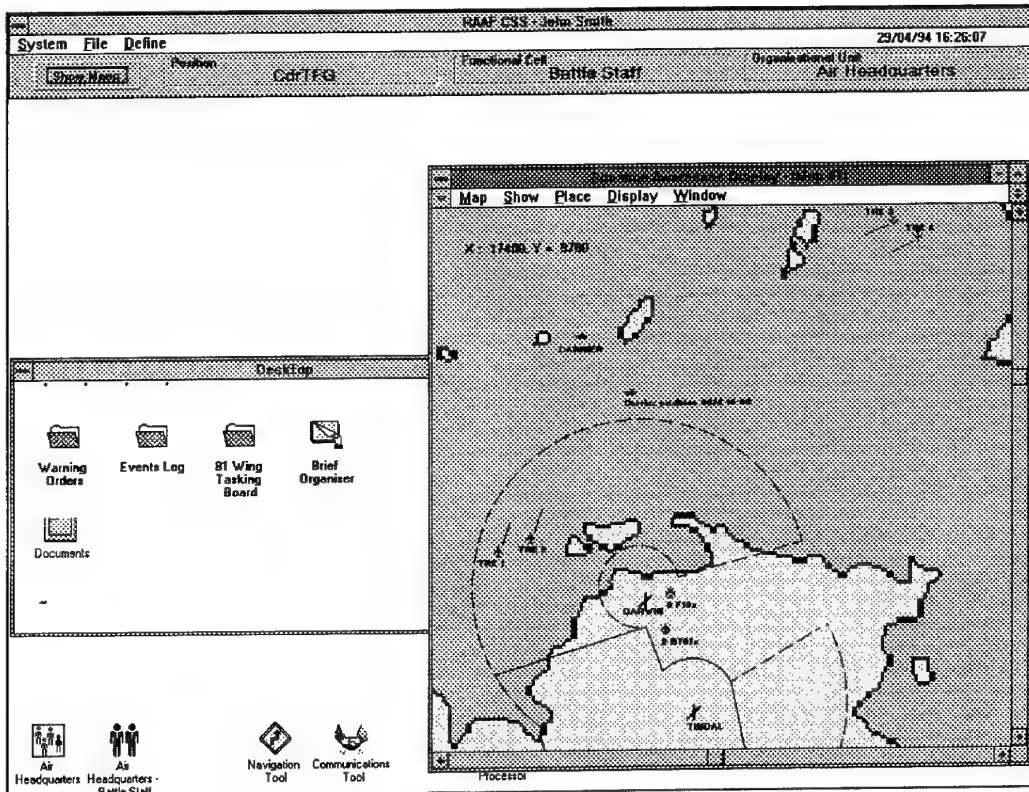
*Figure 10.   Support for creating and visualising plans.*

*Link to Analysis*

Activity agents represent the reason for the existences of organisations—for example, activity agents for the RAAF include air defence, strike, and maritime surveillance. For operational planning scenarios, at least one of these activities is performed and supported.

Context agents represent the background business environments in which situations develop. Context agents provide knowledge about one's own and other forces, those of other countries, along with estimated intentions, legal perspectives, and historical precedents.

Mission Frameworks result from the planning process. They identify how base controllers can use various scenarios to task the right aircraft with the right aircrews to perform necessary tasks at particular times.

## 2.7.   Producing an OPINST

The event *To produce the OPINST, a template for OPINSTs is loaded into the Word Processing tool. The latest INTSUM is displayed, which uses the earlier snapshot provided by the graphical display* introduces two concepts. The first is the ability to perform formal tasks. The second is the ability to link different types of information from various sources.

### 2.7.1.   Performing a Formal Task

*RAAF Example*

PlansTF at Air Headquarters is responsible for producing planning documents according to well-established procedures.

*Concept*

Formal tasks are those associated with roles specified in doctrine as standard operating procedures. Such tasks often require clearly-defined information flows and timings of such flows—formal tasks and information flows, therefore, follow established organisation structures and chains of command.

*Link to Prototype*

The Prototype, which implements this concept, provides tools and information support to users, as shown in Figure 11. Tasks are not represented formally in the Prototype.
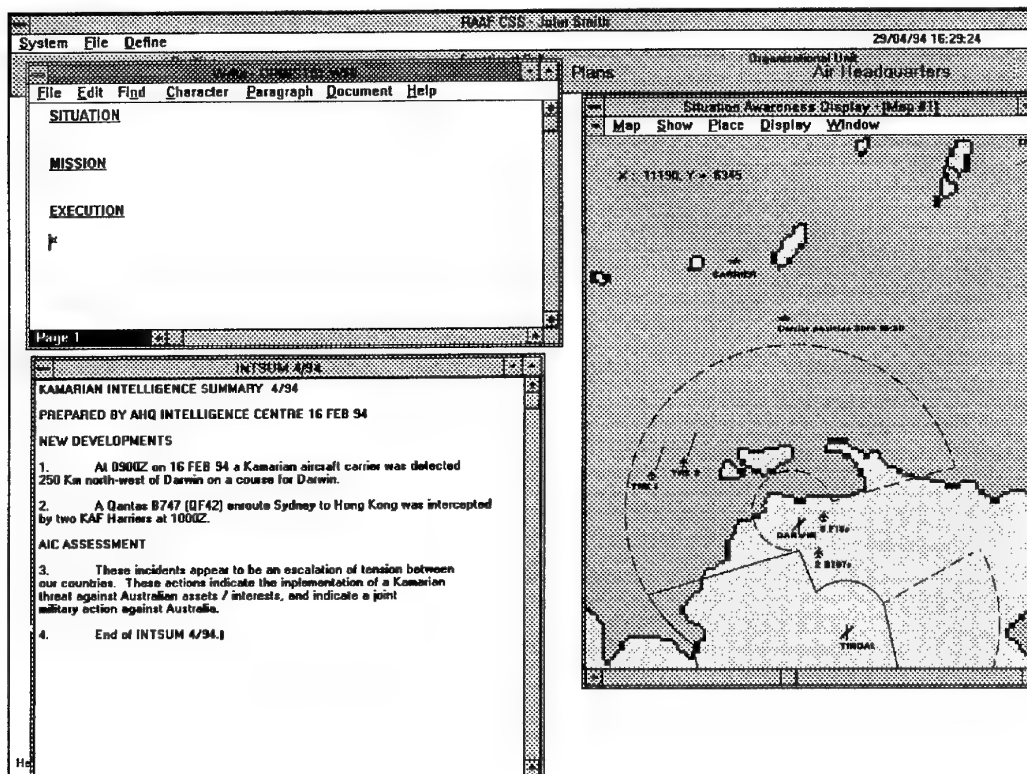


*Figure 11.   Support for performing formal tasks.*

*Link to Analysis*

Task agents represent the workflows performed in organisations. They document the decisions made to perform work tasks, and are linked to all other agents via the Object space.

## 2.7.2. Linking Different Types of Information from Different Sources

### RAAF Example

PlansTF at Air Headquarters is responsible for producing planning documents, which provide added perspectives for the performance of missions. Many sections, including the Situation, Mission, Execution, Administration and Command and Control sections, require information from multiple sources to be integrated in order to understand, to act according to, and thereby to facilitate, the plan across the organisation.

### Concept

Linking different types of information from different sources allows multiple viewpoints to be integrated and facilitates shared understanding.

### Link to Prototype

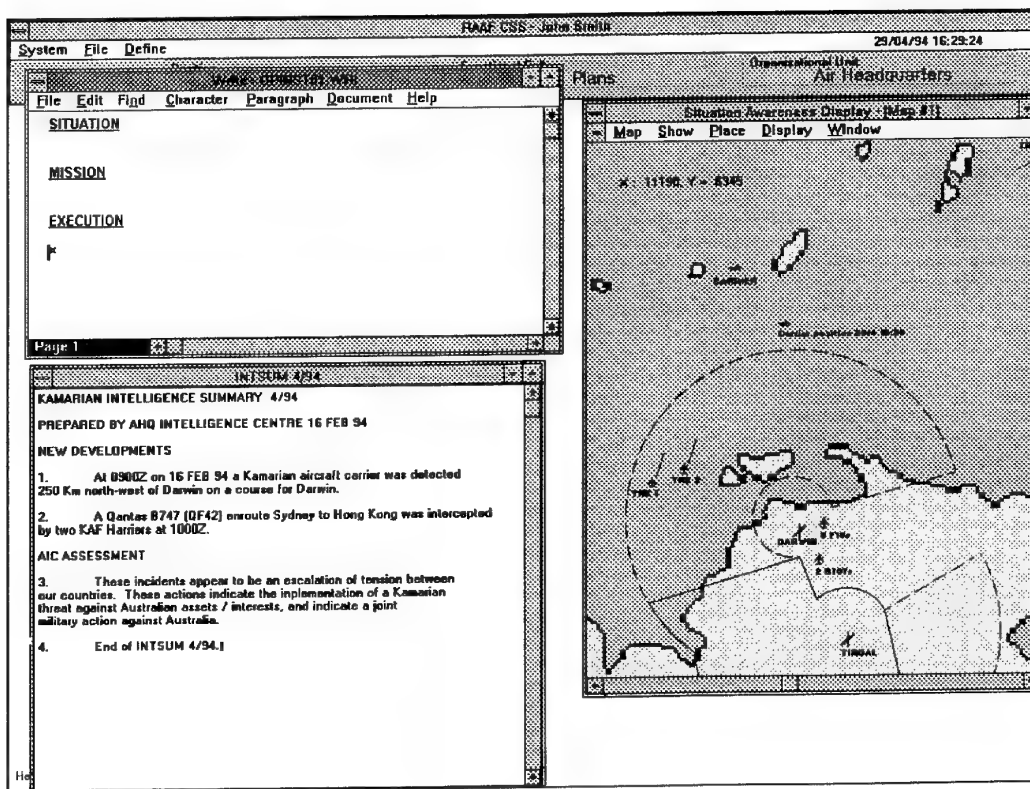The Prototype, which implements this concept, links information from multiple sources, as shown in Figure 12.



*Figure 12.   Support for linking different types of information from different sources.*

### Link to Analysis

Organisation Agents represent the organisation structure. They represent the roles, tools, information and tasks required by individuals within their parts of the organisation structure—for example, Air Command is represented by an Organisation Agent.

Intelligent Agents represent the people in organisations—for example, representing PlansTF at Air Headquarters is an Intelligent Agent PlansTF at Air Headquarters. The information on desktops is documented as part of the information requirements for the Intelligent Agent PlansTF at Air Headquarters.

## 2.8. Changing the Organisation Structure

The event *This entails changing the organisation structure to create a new detachment under 81 Wing, and re-allocating assets from 3 Squadron (F18s) and 33 Squadron (B707s) to the new detachment* introduces two concepts. The first is the ability to change organisation requirements. The second is the ability to re-allocate assets and information dynamically.

### 2.8.1. Changing Organisation Requirements

*RAAF Example*

The RAAF restructures the organisation to meet the needs of situations. Aircraft are deployed to new bases, command and control arrangements are modified, and organisation structures may be created and changed.

*Concept*

A CSS should be able to facilitate changes in its organisation structure. Information, tools, tasks, resources and roles should be re-allocated dynamically without changing underlying codes, databases, or networks.

*Link to Prototype*

The Prototype, which implements this concept, provides an Organisation Tool which enables users to display, create, and change organisation structures as shown in Figure 13.
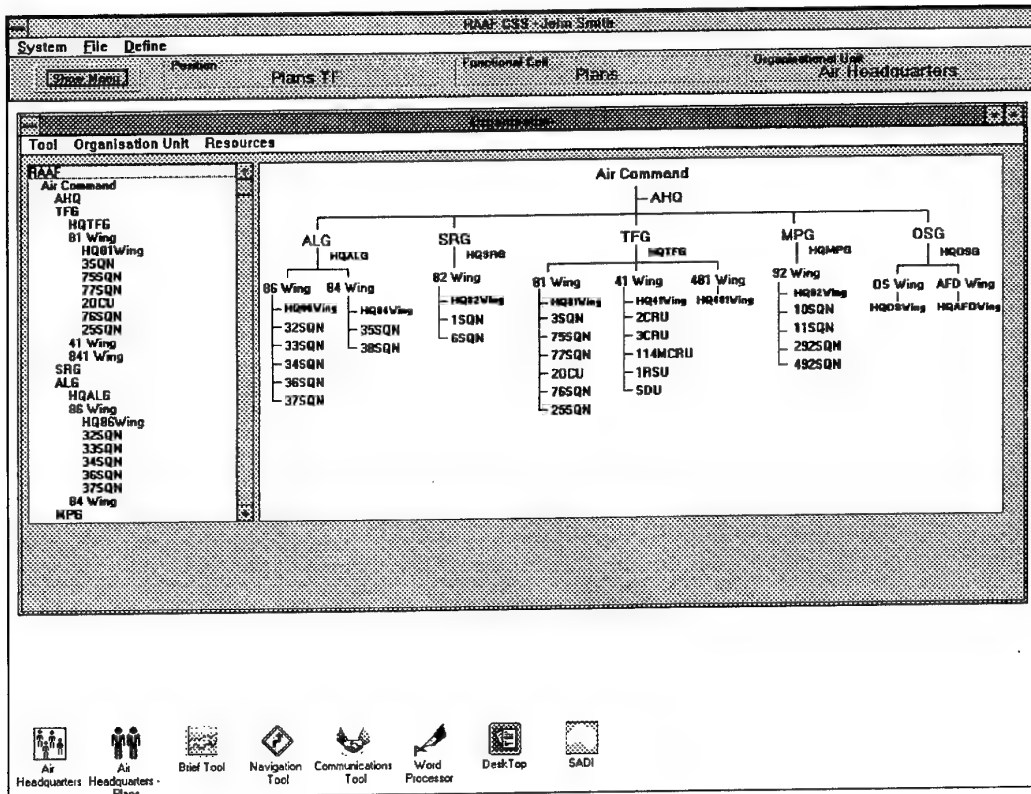
*Figure 13. Support for changing organisation requirements*

## Link to Analysis

Organisation unit agents represent organisation units—for example Headquarters 81 Wing is represented by an organisation unit agent. Organisation unit agents document the roles, tools, information and tasks required by individuals within their parts of the organisation structure.

Organisation agents represent the organisation structure—for example, 81 Wing is represented by an organisation agent. Organisation agents document the roles, tools, information and tasks required by individuals within their parts of the organisation structure.

## 2.8.2.   Re-allocating Assets and Information Dynamically

### RAAF Example

The RAAF restructures the organisation to meet the evolving needs of new situations. Resources may be redeployed—for example, aircraft to new bases—resulting in changed information flows throughout the organisation.

### Concept

A CSS should facilitate users re-allocating assets and information dynamically without changing underlying codes, databases, or networks.

*Link to Prototype*

The Prototype, which implements this concept, provides tools which enable users to display and change the allocation of resources and information throughout the organisation, as shown in Figure 14.
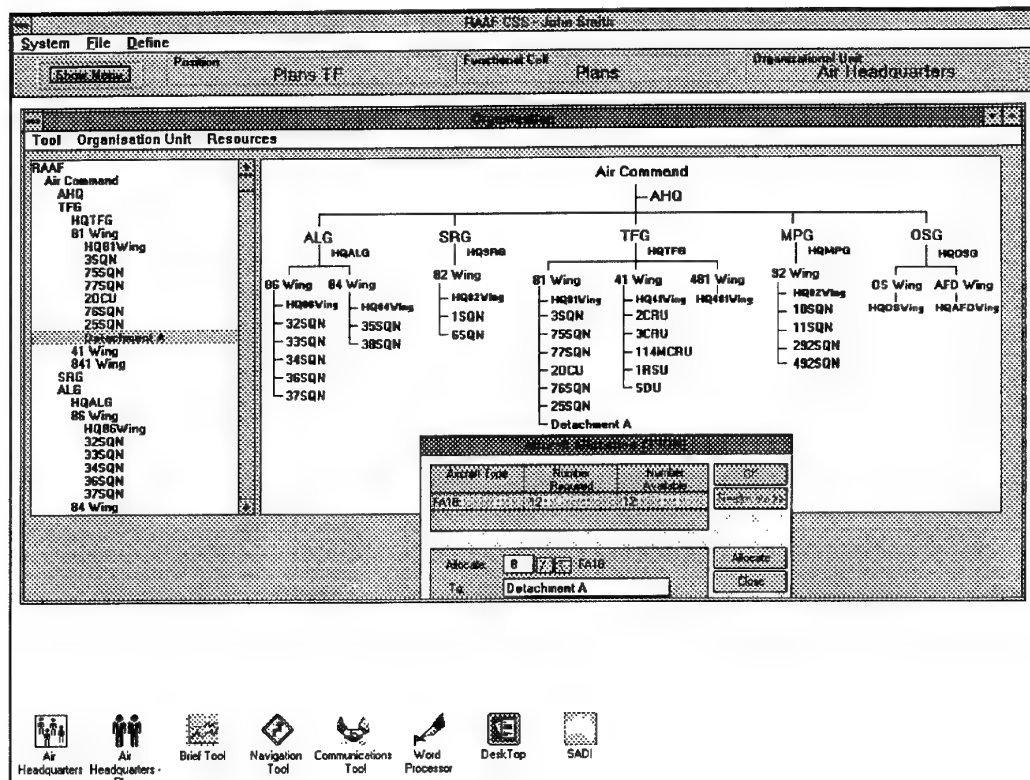


*Figure 14.   Support for re-allocating assets and information dynamically.*

*Link to Analysis*

Organisation agents represent the organisation structure—for example, 81 Wing is represented by an organisation agent. Organisation agents document the roles, tools, information and tasks required by individuals within their parts of the organisation structure.

## 2.9.   The OPSO Changes the Tasking Board to Reflect the New Organisation Structure

The event *The OPSO changes the tasking board to reflect the new organisation structure* introduces the concept of new information tools linked dynamically.

## 2.9.1. Dynamically Link New Information to Tools

### RAAF Example

The RAAF restructures the organisation to meet the needs of situations and re-allocates resources throughout the new organisation structure. Such changes to information requirements need to be reflected in the tools and information which operators use to perform their work tasks. For example, at Headquarters 81 Wing, the OPSO's tasking board has a representation of the organisation structure along with aircraft availability. This information must be updated to reflect current states of the organisation.

### Concept

Users link new information to tools dynamically without changing underlying codes, databases, or networks.

### Link to Prototype

The Prototype, which implements this concept, provides a View Tool which enables users to link information to tools used dynamically in the performance of tasks, as shown in Figure 15.



Figure 15. Support for dynamically linking information to tools.

*Link to Analysis*

Organisation Agents represent the organisation structure. They represent all the roles, tools, information and tasks required by individuals within their parts of the organisation structure—for example, 81 Wing is represented by an Organisation Agent.

Intelligent Agents represent the people in organisations.—for example, representing OPSO at Headquarters 81 Wing is an Intelligent Agent OPSO at Headquarters 81 Wing. The information and tools on desktops are documented as part of the information and tool requirements for the Intelligent Agent OPSO at Headquarters 81 Wing.

## 2.10. Comparing the OPSO and SADC's view of the Alert Status Board

The event *At Detachment A, the OPSO displays the Alert Status Board which shows the aircraft and aircrew on each alert state. The SADC alert status board shows the aircraft available on each alert state* introduces the concept of different views of information for achieving different tasks.

### 2.10.1. Different Views of Information for Different Tasks

*RAAF Example*

The OPSO at an operational squadron and the SADC at SADOC may need the same types of information to perform their individual tasks—their different tasks, however, may subscribe their views of the information. The SADC wants simply to see which aircraft and aircrews are at which alert state, whereas the OPSO very likely wants to see this information in terms of the durations of aircrew alerts and their progress through the various alert states.

*Concept*

Individuals who perform different tasks may require different views of the same information to perform their work tasks.

*Link to Prototype*

The Prototype, which implements this concept, provides a View Tool which enables different users to display the same information in different formats, as shown in Figure 16.

*Figure 16.  Support for different views of information for different tasks.*

*Link to Analysis*

Organisation Agents represent the organisation structure. They represent the roles, tools, information and tasks required by individuals within their parts of the organisation structure—for example, Detachment A and the SADOC are represented by Organisation Agents.

Intelligent Agents represent the people in organisations—for example, representing SADC at the SADOC is an Intelligent Agent SADC at SADOC. The information on desktops is documented as part of the information requirements for the Intelligent Agent SADC at SADOC.

## 2.11.  The effect of scrambling F18s on the OPSO and SADC's Alert Status Board

The event *SADC decides to scramble four F18s and moves the remaining two F18s to a 3-minute alert state. The alert status board for the OPSO is updated automatically with the scramble instructions and the changes of alert states* introduces the concept of distributed decision-making.

## 2.11.1. Distributed Decision-making

*RAAF Example*

The SADC's decision to scramble aircraft has effects throughout the organisation. Pilots are ordered to scramble from their bases of operation, operational squadron needs are notified to enable planning for aircrew rest times and aircraft maintenance to begin, and ultimately the logistics side of the organisation is informed so as to continue the supply of required resources.

*Concept*

The results of making decisions need to be distributed throughout the organisation so that all personnel can operate with the latest information set.

*Link to Prototype*

The Prototype, which implements this concept, offers the dynamic updating of views as information is changed—as shown in Figure 17.



*Figure 17. Support for distributed decision-making.*

*Link to Analysis*

Organisation Agents represent the organisation structure. They represent the roles, tools, information and tasks required by individuals within their parts of the organisation structure—for example, Detachment A and the SADOC are represented by Organisation Agents.

Intelligent Agents represent the people in organisations—for example, representing SADC at the SADOC is an Intelligent Agent SADC at SADOC. The information on desktops is documented as part of the information requirements for Intelligent Agent SADC at SADOC.

# 3. Conclusions

This document has demonstrated how future RAAF CSS can support Air Command personnel performing their work. This has been achieved by linking examples of work performed in Air Command (as described in the "Day in the Life of Air Command" section) to the analysis (as described in the "RAAF Command and Control: An Organisational Analysis Perspective" document), and to the prototype (as described in "Prototype User Interfaces for Future RAAF Command Support Systems" document).

Underlying this work are the following concepts that need to be explicitly represented and supported in CSS:

- Individuals perform Roles

- Individuals work at Desktops

- Individuals perform roles as members of Functional Cells

- Individuals perform roles in Organisational Units

- Views of Information

- Share information across the Organisation

- Communication between Individuals

- Informal Tasks

- Find Information

- Create and Visualise Plans

- Performing a Formal Task

- Linking Different Types of Information from Different Sources

- Changing Organisational Requirements

- Re-allocating Assets and Information Dynamically

- Dynamically Link New Information to Tools

- Different Views of Information for Different Tasks

- Distributed Decision-Making

# Glossary

The following definitions have been sourced from the "RAAF Command and Control: An Organisational Analysis Perspective" document which describes each of these concepts comprehensively.

**Agent**  An agent is something (either people or software) that performs work for someone

**Activity Agents**  Activities are the basic work processes and represent the real work performed by organisations

**Branch**  Branches represent areas of specialisation, such as operations, plans, and logistics

**Context Agent**  Context is the business environment in which agents operate.

**Functional Cell**  Functional cells exist within organisational units to express and perform specialist tasks

**Intelligent Agents**  Intelligent agents are people

**Organisation Agents**  Organisation agents describe why organisations exist, their purposes and current states

**Organisation Unit**  Organisation units represent groups of people whose collective knowledge is required to complete routine tasks

**Resource Agents**  Resource agents collect, hold, and share knowledge about the capabilities of specific resources within organisations

**Role Agents**  Roles describe the function of persons or items in an organisation

**Tasks**  Tasks are basic work units which may be assigned to intelligent agents

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## An Operator's Perspective of RAAF Command Support Systems

### Jennie Clothier, John O'Neill

### DSTO-CR-0005

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**19. Abstract**

DSTO investigated future Command Support System requirements for the RAAF as part of Task Air 93/025 RAAF Command Support Working Group Study.  This document demonstrates how a Command Support System can be used to support Air Command personnel performing their work. A Future Day in the Life of Air Command using these Command Support Systems is described.  For each key event, an example is drawn from the prototypes to demonstrate how the event was implemented, and the event is then linked back to the Organisational Analysis.